

10th Science Lesson 14 Questions in English**14] Transportation In Plants And Circulation In Animals**

1. Which of the following statement is correct?

- 1) Multicellular organisms possess millions of cells in their body
- 2) Every cell needs a constant supply of essential substances like nutrients and oxygen to maintain life and survival
 - a) 1 alone
 - b) 2 alone
 - c) 1, 2
 - d) None

Explanation

Multicellular organisms possess millions of cells in their body. Every cell needs a constant supply of essential substances like nutrients and oxygen to maintain life and survival.

2. Every cell gets its energy by the breakdown of_____

- a) Fats
- b) Minerals
- c) Vitamins
- d) **Glucose**

Explanation

Food is the only source of energy and **every cell gets its energy by the breakdown of glucose**. The cells utilise this energy and govern various vital activities of life.

3. Water and mineral salts absorbed by the roots reach all parts of the plant through_____

- a) Phloem
- b) **Xylem**
- c) Both a and b
- d) None

Explanation

Water absorbed by the roots have to reach entire plant and the food synthesised by the leaves have to be distributed to all the parts of the plant. Water and mineral salts absorbed by the roots reach all parts of the plant through the **xylem**

4. The bulk movement of substances through the vascular tissue is called _____

- a) Transportation
- b) **Translocation**
- c) Transplantation
- d) None

Explanation

The food synthesised by the leaves are translocated to all parts of the plant through the phloem. The **bulk movement of substances through the vascular tissue** is called **Translocation**.

5. Which of the following are transported by Circulatory system?

- a) Salts
- b) Hormones
- c) Oxygen
- d) All the above**

Explanation

In larger organisms, transport of **nutrients, salts, oxygen, hormones and waste products** around the body are **performed by the 'Circulatory system'**

6. Which of the following are included in circulatory system?

- 1) Blood
 - 2) Lymph
 - 3) Heart
 - 4) Blood vessels
- a) 1, 2, 4
 - b) 2, 3, 4
 - c) 1, 2, 3
 - d) All the above**

Explanation

The **circulatory system consists of the circulating fluids, the blood and lymph and the heart and blood vessels** which form the collecting and transporting system.

7. Which of the following statement is correct?

- 1) The movement of molecules from a region of higher concentration to a region of their lower concentration without the utilization of energy is called diffusion
 - 2) It is an active process
- a) 1 alone**
 - b) 2 alone
 - c) 1, 2
 - d) None

Explanation

The movement of molecules in liquid and solids from a region of higher concentration to a region of their lower concentration without the utilization of energy is called diffusion. This is a **passive process**.

8. Active transport is carried out by membrane bound_____

- a) Carbohydrates
- b) Proteins**

- c) Minerals
- d) Salts

Explanation

Active transport utilizes energy to pump molecules against a concentration gradient. **Active transport** is carried out by **membrane bound proteins**.

9. Transport substances from a low concentration to a high concentration is called as_____ transport

- a) Uphill
- b) Downhill
- c) Both a and b
- d) None

Explanation

Proteins use energy to carry substances across the cell membrane hence they are often referred to as pumps. These pumps can **transport substances from a low concentration to a high concentration** ('uphill' transport)

10. Which of the following statement is correct?

- 1) Osmosis is the movement of solvent or water molecules from the region of higher concentration to the region of lower concentration
 - 2) This process is carried out till an equilibrium is reached
 - 3) It is active process
- a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) All the above

Explanation

Osmosis is the movement of solvent or water molecules from the region of higher concentration to the region of lower concentration through a semi-permeable membrane. This process is carried out till an equilibrium is reached. **Osmosis is the passive movement** of water or any other solvent molecules.

11. _____ is a type of diffusion in which a solid absorbs water and gets swelled up

- a) Imbibition
- b) Plasmolysis
- c) Diffusion
- d) None

Explanation

Imbibition is a type of diffusion in which a solid absorbs water and gets swelled up. eg. absorption of water by seeds and dry grapes. If it were not for imbibition, seedlings would not have been able to emerge out of the soil.

12. Which of the following characteristics of root hairs are correct?

- 1) Thin walled
- 2) Slender extension of epidermal cells
 - a) 1 alone
 - b) 2 alone
 - c) **Both 1 and 2**
 - d) None

Explanation

There are millions of root hairs on the tip of the root which absorb water and minerals by diffusion. Root hairs are **thin walled, slender extension of epidermal cell** that increase the surface area of absorption.

13. Which of the following statement is correct?

- 1) Once the water enters the root hairs, the concentration of water molecules in the root hair cells become more than that of the cortex
- 2) Water from the root hair moves to the cortical cells by diffusion and then reaches the xylem
 - a) 1 alone
 - b) 2 alone
 - c) **1, 2**
 - d) None

Explanation

Once the water enters the root hairs, the **concentration of water molecules in the root hair cells become more than that of the cortex**. Thus, water from the root hair moves to the cortical cells by osmosis and then reaches the xylem. From there the water is transported to the stem and leaves.

14. How many distinct pathways are there for water from root hairs to move deeper into root layers?

- a) 3
- b) **2**
- c) 5
- d) 4

Explanation

Water is absorbed along with minerals, by the root hairs, purely by diffusion. Once water is absorbed by the **root hairs, it can move deeper into root layers by two distinct pathways:**

- Apoplast pathway
- Symplast pathway

15. Which of the following statement is correct?

- 1) The apoplastic movement of water occurs exclusively through the intercellular spaces and the walls of the cells
- 2) This movement does not dependent on the gradient

- a) 1 alone
- b) 2 alone
- c) 1, 2
- d) None

Explanation

The apoplastic movement of water occurs exclusively through the intercellular spaces and the walls of the cells. Apoplastic movement does not involve crossing the cell membrane. This movement is dependent on the gradient.

16. Which of the following statement is correct?

- 1) In symplastic movement, the water travels through the cells i.e. their cytoplasm; intercellular movement is through the plasmodesmata
 - 2) Water enters the cells through the cell membrane, hence the movement is relatively slower
- a) 1 alone
 - b) 2 alone
 - c) 1, 2
 - d) None

Explanation

In symplastic movement, the water travels through the cells i.e. their cytoplasm; intercellular movement is through the plasmodesmata. Water enter the cells through the cell membrane, hence the movement is relatively slower. Movement is again down a potential gradient.

17. Transpiration is the evaporation of water in plants through_____ in the leaves

- a) Chloroplast
- b) **Stomata**
- c) Mitochondria
- d) Guard cells

Explanation

Transpiration is the **evaporation of water in plants through stomata in the leaves**. Stomata are open in the day and closed at night.

18. Which of the following statement is correct?

- 1) The opening and closing of the stomata is due to the change in turgidity of the guard cells.
 - 2) When turgidity increases within the two guard cells the stoma closes
- a) **1 alone**
 - b) 2 alone
 - c) 1, 2
 - d) None

Explanation

The opening and closing of the stomata is due to the change in turgidity of the guard cells. When **turgidity increases within the two guard cells the stoma open**. When the guard cells lose water, it becomes flaccid and the stoma closes.

19. Water evaporates from_____ cells of leaves through the open stomata
- Epidermal
 - Mesophyll**
 - Echinodermal
 - None

Explanation

Water evaporates from mesophyll cells of leaves through the open stomata, this lowers water concentration in mesophyll cells.

20. Assertion(A): As water is lost from the leaves, pressure is created at the top to pull more water from the xylem to the mesophyll cells
- Reason(R): Transpiration pull extends up to the roots causing the roots to absorb more water from the soil to ensure continuous flow of water from the roots to the leaves.
- Both (A) and (R) are correct, but (R) does not explain (A)
 - Both (A) and (R) are wrong
 - Both (A) and (R) are correct and (R) explains (A)**
 - (A) is Correct and (R) is wrong

Explanation

As a result of water loss through stomata, more water is drawn into these cells from the xylem present in the veins through the process of osmosis. **As water is lost from the leaves, pressure is created at the top to pull more water from the xylem to the mesophyll cells, this process is called transpiration pull**. This extends up to the roots causing the roots to absorb more water from the soil to ensure continuous flow of water from the roots to the leaves.

21. Which following affects Transpiration?
- Humidity
 - Light
 - Wind speed
 - Temperature
- 1, 2, 3
 - 1, 3, 4
 - 1, 2, 4
 - All the above**

Explanation

Transpiration is affected by several **external factors such as temperature, light, humidity, and wind speed**. Internal factors that affect transpiration include number and distribution of stomata, percentage of open stomata, water status of the plant, canopy structure etc.

22. Which of the following are the importance of Transpiration?

- 1) Creates transpirational pull for transport of water
- 2) Cools the surface of the leaves by evaporation.
- 3) Supplies water for photosynthesis
 - a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

Importance of Transpiration:

- Creates transpirational pull for transport of water
- Supplies water for photosynthesis
- Transports minerals from soil to all parts of the plant
- Cools the surface of the leaves by evaporation
- Keeps the cells turgid; hence, maintains their shape

23. Assertion(A): Root pressure is responsible for pushing water to smaller height of the stem

Reason(R): As ion from the soil are actively transported into the vascular tissue of the root, water moves along and increases the pressure inside the xylem

- a) Both (A) and (R) are correct, but (R) does not explain (A)
- b) Both (A) and (R) are wrong
- c) **Both (A) and (R) are correct and (R) explains (A)**
- d) (A) is Correct and (R) is wrong

Explanation

As ion from the soil are actively transported into the vascular tissue of the root, water moves along and increases the pressure inside the xylem. **This pressure is called root pressure** and is responsible for pushing water to smaller height of the stem.

24. Which of the following statement is correct?

- 1) Plants depend on minerals from soil for its nutritional requirements.
- 2) All minerals cannot be passively absorbed by the roots
 - a) 1 alone
 - b) 2 alone
 - c) **1, 2**
 - d) None

Explanation

Plants depend on minerals from soil for its nutritional requirements. All minerals cannot be passively absorbed by the roots.

25. Which of the following statement is correct?

- 1) The concentration of minerals in the soil is usually lower than the concentration of minerals in the root.
- 2) Most minerals enter the root by active absorption through the cytoplasm of epidermal cells.
- 3) Minerals are present in the soil as charged particles (ions) that cannot move across cell membranes
 - a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

Two factors account for this:

- minerals are present in the soil as charged particles (ions) that cannot move across cell membranes and
- The **concentration of minerals in the soil is usually lower than the concentration of minerals in the root.**

Therefore, most minerals enter the root by active absorption through the cytoplasm of epidermal cells. This needs energy in the form of ATP. Then it is transported to all parts by transpiration pull.

26. Remobilising of minerals from older dying leaves to younger leaves can be seen in_____
- a) **Deciduous plants**
 - b) Tropical evergreen trees
 - c) Temperate trees
 - d) All the above

Explanation

Minerals are remobilised from older dying leaves to younger leaves. This phenomenon can be seen in **deciduous plants**.

27. Which of the following minerals are not remobilised?
- a) Phosphorous
 - b) **Calcium**
 - c) Sulphur
 - d) Nitrogen

Explanation

Elements like phosphorus, sulphur, nitrogen and potassium are easily mobilised, while elements like **calcium are not remobilised**. Small amounts of material exchange takes place between xylem and phloem.

28. Which of the following statement is correct?

- 1) The food synthesised by the leaves are transported by the phloem either to the area of requirement or stored

- 2) Phloem tissue is composed of sieve tubes which have sieve plates
- 3) Cytoplasmic strands pass through the pores in the sieve plates.
 - a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

The food synthesised by the leaves are transported by the phloem either to the area of requirement or stored. **Phloem tissue is composed of sieve tubes which have sieve plates.** Cytoplasmic strands pass through the pores in the sieve plates.

29. _____ transports food (sucrose) from a source to a sink
- a) Xylem
 - b) **Phloem**
 - c) Both a and b
 - d) None

Explanation

Phloem transports food (sucrose) from a source to a sink. The source is part of the plant that synthesise food, i.e., the leaf, and sink, is the part that needs or stores the food. But, the source and sink may be reversed depending on the season, or the plant's need.

30. Movement in xylem is always_____
- a) Bidirectional
 - b) **Unidirectional**
 - c) Tri-directional
 - d) None

Explanation

Since the source-sink relationship is variable, the direction of movement in the phloem can be upwards or downwards, i.e., bidirectional. In contrast, the **movement is always unidirectional in xylem i.e., upwards.**

31. Which of the following statement is incorrect?
- 1) The mechanism of translocation of sugars from source to sink is through pressure flow hypothesis
 - 2) Glucose prepared at source (by photosynthesis) is converted to sucrose.
 - a) 1 alone
 - b) 2 alone
 - c) 1, 2
 - d) **None**

Explanation

The mechanism of translocation of sugars from source to sink is through pressure flow hypothesis. Glucose prepared at source (by photosynthesis) is converted to sucrose.

32. Sucrose moves into the companion cells, then into the living phloem sieve tube cells by ___

- a) **Active transport**
- b) Passive transport
- c) Both a and b
- d) None

Explanation

Sucrose moves into the companion cells, then into the living phloem sieve tube cells by **active transport**. This process produces a hypertonic condition in the phloem.

33. Water in the adjacent xylem moves into the phloem by _____

- a) Diffusion
- b) Translocation
- c) **Osmosis**
- d) Peristaltic waves

Explanation

Water in the adjacent xylem moves into the phloem by osmosis. As osmotic pressure builds up, the phloem sap moves to areas of lower pressure. By active transport sucrose moves into the cells where it is utilised or stored. As sugars are removed, the osmotic pressure decreases and water moves out of the phloem.

34. Which of the following statement is correct?

- 1) The upward movement of water and minerals from roots to different plant parts is called ascent of sap
- 2) A number of factors play a role in ascent of sap
 - a) 1 alone
 - b) 2 alone
 - c) **1, 2**
 - d) None

Explanation

The upward movement of water and minerals from roots to different plant parts is called ascent of sap. A number of factors play a role in ascent of sap and it takes place in following steps.

35. Which of the following statement is correct?

- 1) Water from soil enters the root hairs due to osmosis
- 2) Root pressure is responsible for movement of water up to the base of the stem
 - a) 1 alone
 - b) 2 alone
 - c) **1, 2**

d) None

Explanation

Root Pressure: Water from soil enters the root hairs due to osmosis. Root pressure is responsible for movement of water up to the base of the stem.

36. Water or any liquid rises in a capillary tube because of_____ forces

- a) Chemical
- b) Physical**
- c) Biological
- d) None

Explanation

Water or any liquid rises in a capillary tube because of physical forces, this phenomenon is called capillary action. In the same way, in stem water rises up to certain height because of capillary action.

37. Water molecules form a continuous column in the xylem because of forces of_____ forces

- a) Adhesive
- b) Cohesive
- c) Both a and b**
- d) None

Explanation

Water molecules form a continuous column in the xylem because of **forces of adhesion and cohesion among the molecules**.

38. The force of attraction between molecules of water is called_____

- a) Cohesion**
- b) Adhesion
- c) Both a and b
- d) None

Explanation

The force of attraction between molecules of water is called **cohesion**. The force of attraction between molecules of different substances is called adhesion.

39. Water molecules stick to a xylem because of force of_____

- a) Cohesion
- b) Adhesion**
- c) Both a and b
- d) None

Explanation

The force of attraction between molecules of different substances is called adhesion. **Water molecules stick to a xylem because of force of adhesion**.

40. Assertion(A): Dews are water droplets on the leaves of grass seen in the early mornings, when the climate is humid and excess of water in the soil

Reason(R): This is due to root pressure and this phenomenon is called Guttation

- a) Both (A) and (R) are correct, but (R) does not explain (A)
- b) Both (A) and (R) are wrong
- c) **Both (A) and (R) are correct and (R) explains (A)**
- d) (A) is Correct and (R) is wrong

Explanation

Dews are water droplets on the leaves of grass seen in the early mornings, when the climate is humid and excess of water in the soil. This is **due to root pressure and this phenomenon is called Guttation** which takes place through specialized cells called Hydathodes.

41. Which of the following statement is incorrect?

- 1) Transpiration through stomata creates vacuum which creates a suction. called transpiration pull.
- 2) The transpiration pull sucks the water column from the xylem tubes and thus water is able to rise to great heights even in the tallest plants.
 - a) 1 alone
 - b) 2 alone
 - c) 1, 2
 - d) **None**

Explanation

Transpiration through stomata creates vacuum which creates a suction. called transpiration pull. The transpiration pull sucks the water column from the xylem tubes and thus water is able to rise to great heights even in the tallest plants.

42. The blood consists of_____ main components.

- a) **2**
- b) 4
- c) 3
- d) 1

Explanation

Blood is the main circulatory medium in the human body. It is a red coloured fluid connective tissue. The **blood consists of two main components**. The fluid plasma and the formed elements (blood cells) which are found suspended in the plasma.

43. Plasma is slightly_____

- a) Acidic
- b) **Alkaline**
- c) Both a and b

d) None

Explanation

Plasma is slightly alkaline, non-living intercellular substance which constitutes about 55% of the blood.

44. Which of the following are present in plasma?

- a) Minerals
- b) Proteins
- c) Hormones
- d) All the above**

Explanation

Organic substances like **proteins, glucose, urea, enzymes, hormones, vitamins and minerals** are present in the plasma.

45. What is the other name of Blood platelets?

- a) Erythrocytes
- b) Leucocytes
- c) Thrombocytes**
- d) All the above

Explanation

Blood corpuscles are of three types:

1. Red blood corpuscles (RBC) or Erythrocytes
2. White blood corpuscles (WBC) or Leucocytes
- 3. Blood platelets or Thrombocytes**

46. _____ are the most abundant cells in the human body

- a) RBC**
- b) WBC
- c) Blood platelets
- d) Nephrons

Explanation

Red blood corpuscles (Erythrocytes) are the most abundant cells in the human body. RBC's are formed in the bone marrow.

47. Which of the following statement is correct?

- 1) The RBC's impart red colour to the blood due to presence of respiratory pigment haemoglobin.
 - 2) Their life span is about 180 days.
 - 3) Matured mammalian RBC's do not have cell organelles and nucleus.
- a) 1, 2
 - b) 1, 3**
 - c) 2, 3

d) All the above

Explanation

The RBC's impart red colour to the blood due to presence of respiratory pigment haemoglobin. Matured mammalian RBC's do not have cell organelles and nucleus. They are biconcave and disc-shaped. **Their life span is about 120 days.** RBC is involved in the transport of oxygen from lungs to tissues.

48. Which of the following statement is correct?

- 1) Mammalian RBC lack nucleus and makes the cells biconcave and increase surface area for oxygen binding
- 2) Loss of mitochondria allows the RBC to transport all the oxygen to tissues
 - a) 1 alone
 - b) 2 alone
 - c) 1, 2
 - d) None

Explanation

Mammalian RBC lack nucleus and makes the cells biconcave and increase surface area for oxygen binding, **loss of mitochondria allows the RBC to transport all the oxygen to tissues**, and loss of endoplasmic reticulum allows more flexibility for RBC to move through the narrow capillaries.

49. In which of the following WBC are found?

- 1) Spleen
- 2) Bone marrow
- 3) Thymus
 - a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

WBC are colourless. They do not have haemoglobin and are nucleated cells. It is found in the **bone marrow, spleen, thymus and lymph nodes.**

50. The white blood corpuscles can be grouped into ___ categories

- a) 3
- b) **2**
- c) 4
- d) 5

Explanation

White blood corpuscles (Leucocytes) are capable of amoeboid movement. White blood corpuscles can be grouped into **two categories:**

- Granulocytes

- Agranulocytes

51. Which of the following statement about Granulocytes?

- 1) They contain granules in their cytoplasm.
- 2) Their nucleus is irregular or lobed
- 3) The granulocytes are of two types
 - a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) All the above

Explanation

Granulocytes contain granules in their cytoplasm. Their nucleus is irregular or lobed. The granulocytes are of **three types**:

- Neutrophils
- Eosinophils
- Basophils

52. Neutrophils are large in size and have a_____ lobed nucleus

- a) 3 to 4
- b) 2 to 7**
- c) 1 to 4
- d) 5 to 10

Explanation

Neutrophils are large in size and have a 2 - 7 lobed nucleus. These corpuscles form 60% - 65% of the total leucocytes. Their numbers are increased during infection and inflammation.

53. Eosinophils has a bilobed nucleus and constitute___% -___% of the total leucocytes.

- a) 4 to 8
- b) 2 to 3**
- c) 3 to 4
- d) 5 to 10

Explanation

Eosinophils has a bilobed nucleus and constitute 2% - 3% of the total leucocytes. Their number increases during conditions of allergy and parasitic infections. It brings about detoxification of toxins.

54. _____ release chemicals during the process of inflammation

- a) Basophils**
- b) Eosinophils
- c) Neutrophils
- d) All the above

Explanation

Basophils have lobed nucleus. They form 0.5-1.0% of the total leucocytes. They release chemicals during the **process of inflammation**.

55. How many types of Agranulocytes are there?

- a) 3
- b) 2**
- c) 4
- d) 5

Explanation

Granules are not found in the cytoplasm of these cells. The **agranulocytes are of two types: (i) Lymphocytes (ii) Monocytes**

56. Lymphocytes are about ____ % of the total leucocytes

- a) 20 to 30
- b) 30 to 40
- c) 35 to 45
- d) 20 to 25**

Explanation

Lymphocytes are about 20-25% of the total **leucocytes**. They produce antibodies during bacterial and viral infections.

57. _____ are phagocytic and can engulf bacteria

- a) Lymphocyte
- b) Monocyte**
- c) Basophils
- d) Neutrophils

Explanation

Monocytes are the largest of the leucocytes and are amoeboid in shape. These cells form 5 - 6 % of the total leucocytes. They are **phagocytic and can engulf bacteria**

58. Which of the following statement about blood platelets is correct?

- 1) These are small and colourless
 - 2) There are about 2,50,000 – 4,00,000 platelets / cubic mm of blood
 - 3) Life span of platelets in only 2–3 weeks
- a) 1, 2**
 - b) 1, 3
 - c) 2, 3
 - d) All the above

Explanation

Blood Platelets or Thrombocytes are small and colourless. They do not have nucleus. There are about 2,50,000 – 4,00,000 platelets / cubic mm of blood. **Life span of platelets in only 2–3 days.** They play an important role in clotting of blood. Platelets form clot at the site of injury and prevent blood loss.

59. Match the following

- | | |
|---------------------|---|
| 1) Anemia | 1. Decrease in the number of thrombocytes |
| 2) Leucocytosis | 2. Decrease in number of erythrocytes |
| 3) Leukopenia | 3. Decrease in number of leukocytes |
| 4) Thrombocytopenia | 4. Increase in the number of leukocytes |
- a) 2, 1, 3, 4
b) **2, 4, 3, 1**
c) 3, 1, 2, 4
d) 2, 3, 4, 1

Explanation

Anemia: Decrease in number of erythrocytes.

Leucocytosis: Increase in the number of leukocytes.

Leukopenia: Decrease in number of leukocytes.

Thrombocytopenia: Decrease in the number of thrombocytes.

60. Which of the following are the functions of blood?

- 1) Transport of respiratory gases (Oxygen and CO₂)
 - 2) Transport of digested food materials to the different body cells
 - 3) Transport of hormones
- a) 1, 2
b) 1, 3
c) 2, 3
d) **All the above**

Explanation

Functions of blood:

- **Transport of respiratory gases (Oxygen and CO₂)**
- Transport of digested food materials to the different body cells
- Transport of hormones.
- It acts as buffer and also helps in regulation of pH and body temperature.
- It maintains proper water balance in the body

61. How many types of blood vessels are there?

- a) 2
- b) 4
- c) **3**
- d) 5

Explanation

Blood vessels are a network of branched tubes that transport blood. There are **three types of blood vessels** namely arteries, veins and capillaries.

62. Which of the following statement about Arteries is correct?

- 1) They are thick and elastic vessels that carry blood away from the heart to various organs of the body
- 2) All arteries carry oxygenated blood except the pulmonary artery which carry deoxygenated blood to the lungs
 - a) 1 alone
 - b) 2 alone
 - c) **1, 2**
 - d) None

Explanation

Arteries are thick and elastic vessels that carry blood away from the heart to various organs of the body. All arteries carry oxygenated blood except the pulmonary artery which carry deoxygenated blood to the lungs.

63. Which of the following statement is correct?

- 1) Veins are thick and non-elastic vessels that transport blood to the heart from the different organs.
- 2) All veins carry deoxygenated blood except the pulmonary vein which carry oxygenated blood from the lungs to the heart
 - a) 1 alone
 - b) **2 alone**
 - c) 1, 2
 - d) None

Explanation

Veins are thin and non-elastic vessels that transport blood to the heart from the different organs. All veins carry deoxygenated blood except the pulmonary vein which carry oxygenated blood from the lungs to the heart

64. Which of the following statement about Capillaries is correct?

- 1) Capillaries are narrow tubes formed by branching of arterioles which then unite to form the venules and veins
- 2) They are about 8 μm in diameter
- 3) Capillaries are formed of single layer of leydig cells
 - a) **1, 2**
 - b) 1, 3
 - c) 2, 3
 - d) All the above

Explanation

Capillaries are narrow tubes formed by branching of arterioles which then unite to form the venules and veins. They are about 8 μm in diameter. **Capillaries are formed of single layer of endothelial cells.**

65. Which of the following have open type Circulatory System?

- 1) Arthropods
 - 2) Ascidians
 - 3) Vertebrates
 - 4) Molluscs
- a) 1, 2, 3
 - b) 1, 2, 4**
 - c) 2, 3, 4
 - d) All the above

Explanation

In open type the blood is pumped by heart into blood vessels that open into blood spaces called as sinuses. These sinuses are the body cavities which are called haemocoel. Capillary system is absent. e.g. **Arthropods, Molluscs and Ascidians**

66. Which of the following statement about closed type system is correct?

- 1) In closed type the blood flows in a complete circuit around the body through specific blood vessels
 - 2) The blood flows from arteries to veins through small blood vessels called capillaries
- a) 1 alone
 - b) 2 alone
 - c) 1, 2**
 - d) None

Explanation

In closed type the blood flows in a complete circuit around the body through specific blood vessels. The blood flows from arteries to veins through small blood vessels called capillaries. e.g. Vertebrates.

67. Closed circulatory system was discovered by_____

- a) Theocratus
- b) Darwin
- c) William Harvey**
- d) Thomas Harvey

Explanation

Closed circulatory system was discovered by **William Harvey** (1628) who is regarded the Father of Modern Physiology

68. Which of the following statement about heart is correct?

- 1) Heart is a muscular pumping organ that pumps out the blood into the blood vessels.
- 2) Human heart is situated between the lungs, slightly tilted toward the left and above the diaphragm in the thoracic cavity.
- 3) The heart is made of specialized type of muscle called the cardiac muscle.
 - a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

Heart is a muscular pumping organ that pumps out the blood into the blood vessels. Human heart is situated between the lungs, slightly tilted toward the left and above the diaphragm in the thoracic cavity. The heart is made of specialized type of muscle called the cardiac muscle.

69. _____ fluid which reduces friction during heart beat and protects it from mechanical injuries
- a) Cardiovascular
 - b) **Pericardium**
 - c) Cardium
 - d) None

Explanation

The **heart is enclosed in a double walled sac called pericardium**. It contains lubricating pericardial fluid which reduces friction during heart beat and protects it from mechanical injuries.

70. The human heart is_____ chambered
- a) 1
 - b) 2
 - c) **4**
 - d) 3

Explanation

The **human heart is four chambered**. The two upper thin-walled chambers of the heart are called auricle or atria (sing: atrium) and two lower thick walled chambers are called ventricles.

71. The heart chambers are separated by partition called_____
- a) Pectum
 - b) **Septum**
 - c) Septa
 - d) Centa

Explanation

The **chambers are separated by partition called septum**. The septum between auricles and ventricles prevents the mixing of oxygenated and deoxygenated blood.

72. Which of the following statement is correct?

- 1) The two auricles are separated from each other by interatrial septum
- 2) The left atrium is larger than the right atrium
 - a) 1 alone
 - b) 2 alone
 - c) 1, 2
 - d) None

Explanation

The two auricles are separated from each other by interatrial septum. The **left atrium is smaller than the right atrium.**

73. The right atrium receives deoxygenated blood from different parts of the body through_____
- 1) Superior vena cava
 - 2) Pulmonary veins
 - 3) Inferior vena cava
 - a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) All the above

Explanation

The right atrium receives deoxygenated blood from different parts of the body through the main veins **superior vena cava, inferior vena cava and coronary sinus.**

74. _____bring oxygenated blood to the left atrium from the lungs
- a) **Pulmonary veins**
 - b) Pulmonary artery
 - c) Superior vena cava
 - d) Inferior vena cava

Explanation

Pulmonary veins bring oxygenated blood to the left atrium from the lungs. The right and left auricles pump blood into the right and left ventricles respectively.

75. Which of the following statement is correct?
- 1) The ventricles form the upper part of the heart.
 - 2) The two ventricles are separated from each other by an interventricular septum
 - 3) The left and right ventricles have thick walls because the ventricles have to pump out blood with force away from the heart
 - a) 1, 2
 - b) 1, 3
 - c) **2, 3**
 - d) All the above

Explanation

The **ventricles form the lower part of the heart**. The two ventricles are separated from each other by an interventricular septum. The left and right ventricles have thick walls because the ventricles have to pump out blood with force away from the heart.

76. Which of the following statement is correct?

- 1) The right ventricle gives rise to aorta
- 2) From the right ventricle arises the pulmonary trunk which bifurcates to form right and left pulmonary arteries
- 3) The right and left pulmonary arteries supply deoxygenated blood to the lungs of the respective side.
 - a) 1, 2
 - b) 1, 3
 - c) **2, 3**
 - d) All the above

Explanation

From the right ventricle arises the pulmonary trunk which bifurcates to form right and left pulmonary arteries. The right and left pulmonary arteries supply deoxygenated blood to the lungs of the respective side. The left ventricle is longer and narrower than the right ventricle. The walls are about three times thicker than the right ventricle. **The left ventricle gives rise to aorta**. The oxygenated blood is supplied by the aorta to various organs of the body. The coronary arteries supply blood to the heart.

77. How many types of valve are there in heart?

- a) 2
- b) **3**
- c) 4
- d) 5

Explanation

The valves are the muscular flaps that regulate the flow of blood in a single direction and prevent back flow of blood. The **heart contains three types of valves**.

78. Right atrioventricular valve is located between_____

- 1) Right ventricle
- 2) Left ventricle
- 3) Right auricle
- 4) Left auricle
 - a) 1, 2
 - b) **1, 3**
 - c) 2, 3
 - d) 3, 4

Explanation

Right atrioventricular valve is located between the right auricle and right ventricle. It has three thin triangular leaf like flaps and therefore called tricuspid valve. The apices of the flaps are held in position by chordae tendinae arising from the muscular projection of the ventricle wall known as papillary muscles.

79. Left atrioventricular valve is also known as_____ valve

- 1) Tricuspid
- 2) Bicuspid
- 3) Mitral
 - a) 1, 2
 - b) 1, 3
 - c) **2, 3**
 - d) All the above

Explanation

Left atrioventricular valve is located between the left auricle and left ventricle. It has two cusps and therefore called **bicuspid or mitral valve**

80. Match the following

- | | |
|-------------------------------|---------------|
| I. Two chambered | 1. Aves |
| II. Three chambered | 2. Fishes |
| III. Four chambered | 3. Amphibians |
| IV. Incomplete four chambered | 4. Reptiles |
- a) **2, 3, 1, 4**
 - b) 2, 1, 3, 4
 - c) 1, 2, 3, 4
 - d) 4, 2, 1, 3

Explanation

More to Know

Heart chambers in vertebrate animals

Two chambered: Fishes

Three chambered: Amphibians

Incomplete four chambered: Reptiles

Four chambered: Aves, Mammals and Crocodiles (Reptile)

81. The major arteries (pulmonary artery and aorta) which leave the heart have_____ to prevent backward flow.

- a) Tricuspid
- b) Bicuspid
- c) **Semilunar**

d) Mitral

Explanation

The major arteries (pulmonary artery and aorta) which leave the heart have **semilunar valves which prevent backward flow of blood into the ventricles**. They are the pulmonary and aortic semilunar valves.

82. _____ carries oxygenated blood to all the organs of the body

- a) Superior vena cava
- b) Inferior vena cava
- c) **Aorta**
- d) Pulmonary Vein

Explanation

Circulation of oxygenated blood from the left ventricle of the heart to various organs of the body and return of deoxygenated blood to the right atrium. **Aorta carries oxygenated blood to all the organs of the body.**

83. The path of pulmonary circulation starts in_____

- a) Right auricle
- b) **Right Ventricle**
- c) Left Ventricle
- d) Left Auricle

Explanation

The path of pulmonary circulation starts in the **right ventricle**. Pulmonary artery arises from the right ventricle and reaches the lungs with deoxygenated blood.

84. _____ collect the oxygenated blood from the lungs and supplies it to the left atrium

- a) Superior vena cava
- b) Inferior vena cava
- c) Aorta
- d) **Pulmonary Vein**

Explanation

Pulmonary veins collect the oxygenated blood from the lungs and supplies it to the left atrium of the heart.

85. Which of the following statement is correct?

- 1) The supply of blood to the heart muscles (cardiac muscles) is called as coronary circulation.
 - 2) Cardiac muscles receive oxygenated blood from coronary arteries that originate from the aortic arch.
- a) 1 alone
 - b) 2 alone
 - c) **1, 2**

d) None

Explanation

The **supply of blood to the heart muscles (cardiac muscles) is called as coronary circulation.** Cardiac muscles receive oxygenated blood from coronary arteries that originate from the aortic arch. Deoxygenated blood from the cardiac muscles drains into the right atrium by the coronary sinuses.

86. Which of the following statement is incorrect?

- 1) When the blood circulates twice through the heart in one complete cycle it is called double circulation.
- 2) In double circulation the oxygenated blood do not mix with the deoxygenated blood
 - a) 1 alone
 - b) 2 alone
 - c) 1, 2
 - d) **None**

Explanation

When the blood circulates twice through the heart in one complete cycle it is called double circulation. In double circulation the oxygenated blood do not mix with the deoxygenated blood.

87. In which of the following Single circulation is found?

- a) Fishes
- b) Reptiles
- c) Amphibians
- d) **All the above**

Explanation

In some animals the oxygenated and deoxygenated blood are mixed and pass through the heart only once. This type of circulation is called **single circulation. e.g., fishes, amphibians and certain reptiles.**

88. The heart normally beats_____ times per minute

- a) 72 to 80
- b) **72 to 75**
- c) 73 to 77
- d) 80 to 88

Explanation

One complete contraction (systole) and relaxation (diastole) of the atrium and ventricles of the heart constitute heartbeat. The **heart normally beats 72 – 75 times per minute.**

89. Which of the following statement is correct?

- 1) The human heart is myogenic in nature.
- 2) The SA node is broader at the top and tapering below

- 3) It is made up of thin fibres
- a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

The human heart is myogenic in nature. Contraction is initiated by a specialized portion of the heart muscle, the Sino-atrial (SA) node which is situated in the wall of the right atrium near the opening of the superior vena cava. The SA node is broader at the top and tapering below. It is made up of thin fibres.

90. _____ acts as the 'pacemaker' of the heart
- a) Myogenic node
 - b) Neurogenic node
 - c) **Sino-atrial node**
 - d) None

Explanation

Sino-atrial node acts as the 'pacemaker' of the heart because it is capable of initiating impulse which can stimulate the heart muscles to contract.

91. Atrioventricular bundle was discovered by_____
- a) Thomas Hardy
 - b) Thomas Harvey
 - c) William Harvey
 - d) **His**

Explanation

The wave of contraction from SA node reaches the atrioventricular (AV) node which is stimulated to emit an impulse of contraction spreading to the ventricular muscle via the atrioventricular bundle and the Purkinje fibres. **Atrioventricular bundle was discovered by His (1893)**. So is called Bundle of His.

92. Normal pulse rate ranges from ___ / min
- a) 80 to 120
 - b) **70 to 90**
 - c) 60 to 80
 - d) 70 to 110

Explanation

When the heart beats the blood is forced into the arteries. The expansion of the artery every time the blood is forced into it is called pulse. It can be felt by placing the fingertip on the artery near the wrist. **Normal pulse rate ranges from 70 – 90 / min.**

93. Each cardiac cycle lasts about_____ sec

- a) 0.3
- b) 0.8**
- c) 0.11
- d) 0.5

Explanation

The sequence of events occurring from the beginning to the completion of one heart beat is called cardiac cycle. During cardiac cycle blood flows through the chambers of the heart in a specific direction. **Each cardiac cycle lasts about 0.8 second.**

94. Match the following

- | | |
|---------------------------|------------|
| I. Atrial systole | 1. 0.4 sec |
| II. Ventricular systole | 2. 0.1 sec |
| III. Ventricular diastole | 3. 0.3 sec |

- a) 2, 1, 3**
- b) 2, 3, 1
- c) 3, 1, 2
- d) 1, 3, 2

Explanation

- Atrial systole: Contraction of auricles (0.1 sec)
- Ventricular systole: Contraction of ventricles (0.3 sec)
- Ventricular diastole: Relaxation of ventricles (0.4 sec)

95. Which of the following statement is correct?

- 1) The rhythmic closure and opening of the valves cause the sound of the heart
 - 2) The first sound LUBB is short duration
 - 3) The second sound DUPP is of a shorter duration
- a) 1, 2
 - b) 1, 3**
 - c) 2, 3
 - d) All the above

Explanation

The **rhythmic closure and opening of the valves cause the sound of the heart**. The **first sound LUBB is of longer duration** and is produced by the closure of the tricuspid and bicuspid valves after the beginning of ventricular systole. The **second sound DUPP is of a shorter duration** and produced by the closure of semilunar valves at the end of ventricular systole.

96. Which of the following statement is correct?

- 1) Blood pressure is the force exerted during the flow of blood against the lateral walls of arteries
- 2) Blood pressure is usually expressed in terms of the systolic pressure and diastolic pressure

- a) 1 alone
- b) 2 alone
- c) 1, 2
- d) None

Explanation

Blood pressure is the force exerted during the flow of blood against the lateral walls of arteries. The blood pressure is high in the arteries gradually drops in the arterioles and capillaries and become very low in the veins. **Blood pressure is usually expressed in terms of the systolic pressure and diastolic pressure.**

97. Which of the following statement is correct?

- 1) During ventricular systole, the left ventricle contracts and forces blood into the aorta
 - 2) The pressure rises to a peak which is referred as Diastolic pressure
 - 3) During diastole, the ventricles relax and the pressure falls to the lowest value which is referred as diastolic pressure
- a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

Systolic pressure: During ventricular systole, the **left ventricle contracts** and forces blood into the aorta. The pressure rises to a peak which is referred as **systolic pressure**

Diastolic pressure: During diastole, **the ventricles relax** and the pressure falls to the lowest value which is referred as **diastolic pressure.**

98. In a healthy adult systolic and diastolic blood pressure is expressed a_____ mm Hg

- a) 70 to 110
- b) **80 to 120**
- c) 90 to 130
- d) 80 to 100

Explanation

In a healthy adult during normal resting condition systolic and diastolic blood pressure is expressed as **120mm / 80mm Hg**. Blood pressure varies during conditions of physical exercise, anxiety, emotions, stress and sleep.

99. Which of the following statement is correct?

- 1) Decrease in blood pressure is termed hypotension
 - 2) A prolonged or constant elevation of blood pressure is a condition known as hypertension
- a) 1 alone
 - b) 2 alone
 - c) **1, 2**

d) None

Explanation

A prolonged or constant elevation of blood pressure is a condition known as **hypertension (High blood pressure)** can increase the risk of heart attack and stroke. Decrease in blood pressure is termed **hypotension (Low blood pressure)**

100. _____ is used to detect the sound produced by the internal organs of human body

- a) Sphygmomanometer
- b) Pulse Oximeter
- c) **Stethoscope**
- d) Thermometer

Explanation

A **stethoscope** is used to detect the sound produced by the internal organs of human body. The heart **sound** is heard by placing the stethoscope on the chest.

101. Which of the following statement is correct?

- 1) Sphygmomanometer is a clinical instrument used to measure blood pressure when a person is in a relaxed and resting condition
 - 2) It helps to diagnose conditions such as increased or decreased blood pressure.
 - 3) Monometric and modern digital types are the apparatus used to measure blood pressure
- a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

Sphygmomanometer is a clinical instrument used to measure blood pressure when a person is in a relaxed and resting condition. The pressure of the brachial artery is measured. It helps to diagnose conditions such as increased or decreased blood pressure. **Monometric and modern digital types are the apparatus used to measure blood pressure.**

102. The concept of blood grouping was developed by_____

- a) William Digboi
- b) William Harvey
- c) Harvey Dent
- d) **Karl Landsteiner**

Explanation

The **concept of blood grouping was developed by Karl Landsteiner (1900)**. He identified blood groups A, B and O. AB blood group was recognized by Decastello and Steini (1902).

103. Which of the following statement is correct?

- 1) Human blood contains certain specific substances called agglutinogens or antigens and agglutinins or antibodies
- 2) Human blood group is classified into five groups called A, B, C, AB and O
- 3) Antigens are found on the membrane surface of RBC
 - a) 1, 2
 - b) 1, 3**
 - c) 2, 3
 - d) All the above

Explanation

Human blood contains certain specific substances called agglutinogens or antigens (Ag) and agglutinins or antibodies (Ab). Antigens are found on the membrane surface of RBC. Antibodies are present in blood plasma. **Based on the presence or absence of antigen and antibodies human blood group is classified into four groups called A, B, AB and O.**

104. Which of the following statement is correct?

- 1) In 'A' group individuals, Antigen A is present on the surface of RBC and antibody b (anti-b) is present in the plasma
- 2) In 'B' group individuals, Antigen B is present on the surface of RBC and antibody a (anti - a) is present in the plasma.
- 3) In 'O' group individuals, Antigen A or B are absent on the surface of RBC.
 - a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) All the above**

Explanation

- A' group individuals: Antigen A is present on the surface of RBC and antibody b (anti-b) is present in the plasma.
- 'B' group individuals: Antigen B is present on the surface of RBC and antibody a (anti - a) is present in the plasma.
- 'AB' group individuals: Antigens A and B are present on the surface of RBC and antibodies are absent in the plasma.
- 'O' group individuals: **Antigen A or B are absent on the surface of RBC.** However, the plasma contains both antibodies a and b (anti a and b).

105. _____ blood group are called 'Universal Recipient'

- a) A
- b) B
- c) AB**
- d) O

Explanation

In blood transfusion one must consider the antigen and antibody compatibility (matching) between the donor and the person receiving blood (recipient). Persons with '**AB**' blood group are called '**Universal Recipient**' as they can receive blood from persons with any blood group.

106. _____ blood group are called 'Universal Donor'

- a) A
- b) AB
- c) O
- d) B

Explanation

Persons with '**O**' blood group are called '**Universal Donor**' as they can donate blood to persons with any blood group

107. Which of the following statement is correct?

- 1) Rh factor was discovered by Landsteiner and Wiener in 1940 in Rhesus monkey
 - 2) The surface of WBC contains the antigen for Rh factor.
- a) 1 alone
 - b) 2 alone
 - c) 1, 2
 - d) None

Explanation

Rh factor was discovered by Landsteiner and Wiener in 1940 in Rhesus monkey. The **surface of RBC contains the antigen for Rh factor**. Rh+ (positive) persons have Rh antigen on the surface of RBC while, Rh- (negative) persons do not have Rh antigen on the surface of RBC. Antibodies developed against this Rh antigen is called Rh antibodies.

108. Which of the following does not form the part of lymphatic system?

- a) Lymph node
- b) Lymphatic Ducts
- c) Lymphatic capillaries
- d) None

Explanation

The **lymphatic system comprises of lymphatic capillaries, lymphatic vessels, lymph nodes and lymphatic ducts**. Lymph is the fluid that flows through the lymphatic system.

109. The lymphatic capillaries unite to form large_____

- a) Lymph node
- b) Lymphatic Ducts
- c) Lymphatic Veins
- d) **Lymphatic Vessels**

Explanation

The **lymphatic capillaries unite to form large lymphatic vessels**. Lymph nodes are small oval or pear-shaped structures located along the length of lymphatic vessels.

110. Which of the following statement is correct?

- 1) Lymph from the intercellular spaces drains into lymphatic capillaries.
- 2) Lymph is a colourless fluid formed when plasma, proteins and blood cells escape into intercellular spaces in the tissues through the pores present in the walls of capillaries.
- 3) The lymph contains very small amount of nutrients, oxygen, CO₂, water and WBC
 - a) 1, 2
 - b) 1, 3
 - c) 2, 3
 - d) **All the above**

Explanation

Lymph from the intercellular spaces drains into lymphatic capillaries. Lymph is a colourless fluid formed when plasma, proteins and blood cells escape into intercellular spaces in the tissues through the pores present in the walls of capillaries. It is similar to blood plasma, but is colourless and contains less proteins. The lymph contains very **small amount of nutrients, oxygen, CO₂, water and WBC**.

111. Which of the following are the functions of Lymph?

- 1) Supplies nutrition and oxygen to all parts where blood can reach
- 2) The lymph also carries absorbed fats from small intestine to the blood
- 3) Lymphocytes in the lymph defend the body from infections
 - a) 1, 2
 - b) 1, 3
 - c) **2, 3**
 - d) All the above

Explanation

Functions of Lymph:

- **Supplies nutrition and oxygen to those parts where blood cannot reach**
- It drains away excess tissue fluid and metabolites and returns proteins to the blood from tissue spaces.
- The lymph also carries absorbed fats from small intestine to the blood. The lymphatic capillaries of intestinal villi (lacteals) absorb digested fats.
- Lymphocytes in the lymph defend the body from infections.